

MARITIME SAFETY COMMITTEE  
102nd session  
Agenda item 21

MSC 102/21/3  
7 February 2020  
Original: ENGLISH  
Pre-session public release:

## WORK PROGRAMME

### Proposal for a new output to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerships to fight container fires

Submitted by Marshall Islands, Singapore, IACS and WSC

#### SUMMARY

*Executive summary:* This document proposes a new output to be included in the biennial agenda of the Sub-Committee on Ship Systems and Equipment (SSE) to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerships to fight container fire, with a view to amending SOLAS and the FSS Code, as required

*Strategic direction, if applicable:* 6

*Output:* Not applicable

*Action to be taken:* Paragraph 27

*Related documents:* Not applicable

1 This document is submitted in accordance with the provisions of paragraphs 4.6 and 6.12.2 of the *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.1), taking into account the *Application of the Strategic Plan of the Organization* (resolution A.1111(30)), and section 3.2.1 of the *Guidance on drafting of amendments to the 1974 SOLAS Convention and related mandatory instruments* (MSC.1/Circ.1500/Rev.1).

#### Introduction

2 The co-sponsors are of the opinion that there is a need to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerships to fight container fires. Based on the outcome of evaluation, there is also a need to amend SOLAS and the International Code for Fire Safety Systems Code (FSS Code), as required. The intent would be to develop goal-based standards to ensure the readiness and effectiveness of such arrangements in mitigating container fires on board containerships. The co-sponsors, therefore, propose a new output for inclusion in the biennial agenda for 2020-2021 of the SSE Sub-Committee.

3 Recently, there have been several cases of container-related fires occurring on board containerships with serious consequences. In the past two years, serious container fires have occurred on multiple containerships.

4 Consideration should also be given to the potential impact of the increasing containership sizes over the years, with some having a cargo capacity exceeding 20,000 TEUs. This necessitates a review of the fire protection, detection and extinction arrangements with regard to factors, such as sufficient coverage, capacity, remote operation and ergonomic arrangements.

5 Given the above, the co-sponsors are of the view that existing fire protection, detection and extinction arrangements on board containerships could be inadequate to provide the crew with the necessary capability to contain and extinguish container fires in the cargo hold or above deck. As such, the co-sponsors are of the opinion that the requirements concerning fire protection, detection and extinction arrangements in SOLAS and the FSS Code should be reviewed, updated and improved, as required, for containerships, taking into consideration the development of IMO goal-based standards.

### **IMO's objectives**

6 This proposal for a new output to review the adequacy of fire protection, detection and extinction arrangements, with a view to amending SOLAS and the FSS Code, as required, lies within IMO's mission statement of promoting safe, secure and environmentally sound, efficient and sustainable shipping.

7 This proposal is also consistent with IMO's strategic direction (SD) 6 which aims to "ensure that a universally adopted, effective, international regulatory framework is in place and implemented consistently, embracing and integrating new and advancing technologies, without causing unnecessary burdens", as set out in the *Strategic Plan for the Organization for the six-year period 2018 to 2023* (resolution A.1110(30)).

### **Need**

8 The adequacy of existing fire protection, detection and extinction arrangements on board containerships has been put into question by recent events of container-related fires on containerships that have had major consequences, i.e. loss of lives of crew, damage to ship and cargo, and resultant financial losses to owners and charterers. The high number of such fire incidents call for serious attention and action. Notwithstanding the urgent need to identify the causative factors of containership fires and to minimize the incidences of mis- or non-declarations of dangerous goods, it is equally critical for ships and crew to be well equipped to handle and contain such fires when they occur, at the very least, until assistance arrives. Hence, there is an urgent need to ensure that containerships are adequately equipped to protect, detect and extinguish container fires.

### **Analysis of the issue**

9 The following items are some examples where the adequacy of existing fire protection, detection and extinction arrangements on board containerships needs to be evaluated. The items listed are not exhaustive and interested Member States and international organizations are invited to submit comments and proposals to the SSE Sub-Committee for discussion, should this output be approved.

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**Fixed fire protection system for cargo holds**

10 On a modern-day containership where containers may be stacked in holds as deep as ten tiers below deck, fire-fighting access to the particular container caught on fire often proves to be a challenge. When the fire is not contained and spreads to other containers in the hold, it may necessitate injecting CO<sub>2</sub> via the fixed fire-extinguishing system into the affected cargo hold. Despite doing so, there have been a number of cases where the container fire still could not be extinguished. The ship may then have to resort to flooding the affected cargo hold with seawater, for which fixed means do not exist as per existing regulations.

11 This may indicate that the current primary fixed fire-fighting system for cargo holds is not adequate and requires a review. For example, a secondary and independent means of fixed fire-extinguishing systems or other alternatives according to goal-based standards may be considered.

**Fire-fighting equipment on deck**

12 SOLAS regulation II-2/10.1.2 states:

"For open-top container holds and on deck container stowage areas on ships designed to carry containers on or above the weather deck, constructed on or after 1 January 2016, fire protection arrangements shall be provided for the purpose of containing a fire in the space or area of origin and cooling adjacent areas to prevent fire spread and structural damage."

13 The current requirements for additional fire-fighting equipment for ships constructed on or after 1 January 2016 designed to carry containers on or above the weather deck may be insufficient to fight a serious container fire.

14 Currently, the water mist lance as defined in SOLAS regulation II-2/10.7.3.1 is not required to be type approved and there are no known test standards for this equipment. As observed during port State control and flag State control inspections on board containerships, the material, quality, size and weight of these lances differs from ship to ship. Some of the models are noted to be cumbersome and ineffective in piercing modern-day high tensile steel containers which are rigid and strong in build quality. Consideration should be given for type approval of such lances designed to ensure its ability to penetrate high tensile steel containers and for ships to carry alternative container breaching equipment which can breach the shell of a container remotely or at least from a safe distance, to better ensure the safety of crew during a container fire. Other alternatives according to goal-based standards may also be considered.

15 In accordance with the requirements of SOLAS regulation II-2/10.7.3.2, ships designed to carry five or more tiers of containers on or above the weather deck shall carry mobile water monitors, as follows:

- .1 ships with breadth of less than 30 m: at least two mobile water monitors; or
- .2 ships with breadth of 30 m or more: at least four mobile water monitors.

16 Taking into consideration the cargo stowage arrangement for modern-day containerships where containers can be stacked up to 10 tiers high above deck, the number and design of such water monitors to allow remote fire fighting may not be sufficient and should be reviewed.

17 Additional equipment for fighting containership fires remotely, such as fire nozzle holders that can be mounted on railings or container shoes to allow additional unmanned fire hoses to be rigged anywhere along lashing bridges or shipside railings, should be explored as part of the proposed evaluation to provide additional boundary cooling for fire on container decks.

### ***Fire-fighters' communication equipment***

18 As per existing SOLAS regulation II-2/10.10.4, for ships constructed on or after 1 July 2014, a minimum of two two-way portable radiotelephone apparatus for each fire party for fire-fighters' communication shall be carried on board. These two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe. The remaining ships constructed before 1 July 2014 shall also comply with the requirements of this paragraph not later than the first survey after 1 July 2018.

19 Currently, there are no requirements that define the minimum extent of radio coverage and also ensure hands-free operation of these two-way portable radiotelephone apparatus while being used by crew fighting an actual fire. In practice, after donning the full fire-fighter's outfit and holding a fully pressurized fire hose, it is cumbersome and impractical for fire-fighters to operate and communicate via the two-way portable radiotelephone apparatus without hands-free arrangements. Based on the industry feedback, it is learned that radio reception coverage for hand-held radiotelephone apparatus is poor in confined spaces or spaces that are located far away from the bridge where the command team is located. As a result, critical communications often become inaudible during such scenarios and renders the portable radiotelephone apparatus ineffective. The proposed evaluation should include a review on the need for hands-free operation of the two-way portable radiotelephone apparatus and/or alternative goal-based standards for effective communication.

### **Analysis of implications and benefits**

20 The proposed new output, which aims to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerships to fight container fire, with a view to amending SOLAS and the FSS Code as required, might have cost implications to the containership industry.

21 The recommendations arising from the evaluation should give due consideration to the distinction between existing and newbuild ships, to ensure that any new measures and requirements in accordance with goal-based standards would be feasible, realistic and reasonable.

### **Industry standards**

22 The fire-fighting challenges and issues faced by the crew with the increasing size of containerships have not been taken into consideration nor have new mitigation measures been incorporated into the existing regulatory framework for the fire protection, detection and extinction on board containerships. This proposed new output would take into consideration relevant industry best practices, standards, new equipment and technologies in order to improve and update the existing regulatory framework for containerships.

23 Any recommendations from the proposed evaluation should be based on goal-based standards, in order to remain relevant with technological developments and industry trends, such as increasing ship sizes. The relevancy of mandatory regulatory requirements is critical in order to ensure that ships are adequately equipped to protect, detect and extinguish container fires on board containerships.

**Output**

24 The proposed new output, if approved, should be considered by the SSE Sub-Committee, at its eighth session, to evaluate the adequacy of fire protection, detection and extinction arrangements on board containerhips to fight container fire, with a view to amending SOLAS and the FSS Code, as required.

**Human element**

25 The checklist for considering "human element issues by IMO bodies" (MSC-MEPC.7/Circ.1) is set out in annex 2 of this document.

**Priority / urgency**

26 The co-sponsors suggest that this issue should be considered by the Organization as a matter of priority. The new output should be included to the biennial agenda for 2020-2021 of the SSE Sub-Committee and in the provisional agenda of SSE 8, to be completed in two sessions.

**Action requested of the Committee**

27 The Committee is invited to consider the above proposal and take action, as appropriate.

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**ANNEX 1**

**CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS**

This checklist should be used when preparing the analysis of implications required in submissions of proposals for inclusion of outputs. For the purpose of this analysis, the term "administrative requirements" is defined in resolution A.1043(27), i.e. administrative requirements are an obligation arising from future IMO mandatory instruments to provide or retain information or data.

**Instructions:**

- (A) If the answer to any of the questions below is **YES**, the Member State proposing an output should provide supporting details on whether the requirements are likely to involve start-up and/or ongoing costs. The Member State should also give a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?).
- (B) If the proposal for the output does not contain such an activity, answer **NR** (Not required).
- (C) For any administrative requirement, full consideration should be given to electronic means of fulfilling the requirement in order to alleviate administrative burdens.

<p>1. Notification and reporting?</p> <p>Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members</p>	<p><b>NR</b> ✓</p>	<p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p>
<p>Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)</p>		
<p>2. Record keeping?</p> <p>Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education</p>	<p><b>NR</b> ✓</p>	<p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p>
<p>Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes) <i>If consideration of design profiles of existing ships is used to determine underwater vessel noise outputs, a database of measurements following international or ISO standards may be required.</i></p>		
<p>3. Publication and documentation?</p> <p>Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing</p>	<p><b>NR</b> ✓</p>	<p>Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p>
<p>Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes)</p>		
<p>4. Permits or applications?</p> <p>Applying for and maintaining permission to operate, e.g. certificates, classification society costs</p>		<p>Yes <input checked="" type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p>
<p>Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes) : Same answer as in 5 below</p>		
<p>5. Other identified requirements?</p>		<p>Yes <input checked="" type="checkbox"/> Start-up <input type="checkbox"/> Ongoing</p>
<p>Description of administrative requirement(s) and method of fulfilling it: (if the answer is yes) <i>In case that owing to the development of the output there is a need to amend SOLAS and/or the FSS Code, there may be administrative requirements, however this cannot be identified at this stage.</i></p>		

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**ANNEX 2**

**CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES**

<b>Instructions:</b> If the answer to any of the questions below is:	
(A) <b>YES</b> , the preparing body should provide supporting details and/or recommendation for further work.	
(B) <b>NO</b> , the preparing body should make proper justification as to why human element issues were not considered.	
(C) <b>NA</b> (Not Applicable) the preparing body should make proper justification as to why human element issues were not considered applicable.	
<b>Subject Being Assessed:</b> (e.g. Resolution, Instrument, Circular being considered)	
A review of SOLAS, the FSS Code to address adequacy of fire-fighting equipment on board containerships.	
<b>Responsible Body:</b> (e.g. Committee, Sub-committee, Working Group, Correspondence Group, Member State)	
MSC	
1. Was the human element considered during development or amendment process related to this subject?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
2. Has input from seafarers or their proxies been solicited?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
4. Have human element solutions been made as an alternative and/or in conjunction with technical solutions?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	
• Administrations?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Shipowners/managers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Seafarers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
• Surveyors?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
7. Does the solution address safeguards to avoid single person errors?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
8. Does the solution address safeguards to avoid organizational errors?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
10. Have human element experts been consulted in development of the solution?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<b>11. HUMAN ELEMENT: Has the proposal been assessed against each of the factors below?</b>	
<input type="checkbox"/> CREWING. The number of qualified personnel required and available to safely operate, maintain, support and provide training for system.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA

<input type="checkbox"/> PERSONNEL. The necessary knowledge, skills, abilities and experience levels that are needed to properly perform job tasks.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills, and abilities to achieve desired job/task performance.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> OCCUPATIONAL HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc. to properly manage risks.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate, and other factors that affect crew endurance, fatigue, alertness and morale.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<input type="checkbox"/> HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive, and sensory abilities of the user population.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<p><b>Comments:</b> (1) Justification if answers are NO or Not Applicable. (2) Recommendations for additional human element assessment needed. (3) Key risk management strategies employed. (4) Other comments. (5) Supporting documentation.</p> <p>The proposal is to develop a work plan, which includes a review of <b>SOLAS and the FSS Code to address adequacy of fire detection and fire-fighting equipment on board containerships</b>. This will not change any setting with regard to human elements, as it is primarily addressing fire safety matters, however, solutions could result in equipping seafarers with better equipment and systems to handle cargo related container fires on board containerships.</p>	